HVPS Logic

Preaccelerator HV regulation logic

Fri, Jul 17, 1998

The LA called HVPS operates its logic every second. The logic is organized into states and is presented here in prose. Initially state = 0, backedOff = false. A flag bit is set while state = 0. Every second, each nonzero entry times[i], i = 1 to 3, is decremented. This should prevent automatic trip recovery if more than 3 occur in one minute, forcing manual recovery before automatic logic resumes.

state = 0: *Await normal operation without trip status*

```
If no trip status present,
        clear flag bit;
        clear times[i], i=1 to 3;
        state = 1;
else
        set flag bit.
```

state = 1: *Await trip condition*

```
If trip status present,
        If times[i] = 0,
                waitCnt = 5;
                state = 2;
        else
                state = 0.
```

state = 2: *After delay, reset trips, decrease HV*

```
If trips status present
        Decrement waitCnt;
        If waitCnt = 0
                Reset trips;
                Reduce HV by 4000 steps, which is 400 volts (at 150 Hz rate);
                backedOff = true;
                state = 3;
else
        state = 1.
```

state = 3: *Await completion of HV decrease, turn on HV*

```
If  HV adjustment complete,
        If wait > 0
                Decrement wait;
        else
                HVPS ON;
                wait = 1;
                state = 4;
```

```
state = 4:      After delay, turn on reference source
        If wait > 0
                Decrement wait;
        else
                Reference source ON;
                times[i] = 60;
                Advance i;
                wait = 1;
                state = 5;


state = 5:      After delay, increase HV
        If wait > 0
                Decrement wait
        else
                If backedOff
                        Increase HV by 4000 steps;
                        backedOff = false;
                        wait = 1;
                        state = 6;
                else
                        state = 1;


state = 6:      Terminate HV increase if exceed HV nominal value.
        If wait > 0
                Decrement wait;
        else
                If HV > nominal
                        Stop HV adjustment;
                        state = 1;
                else
                        If HV adjusting finished,
                                state = 1;
```